

# Secondary Containment System

304B Chapter 4.2

# Objectives

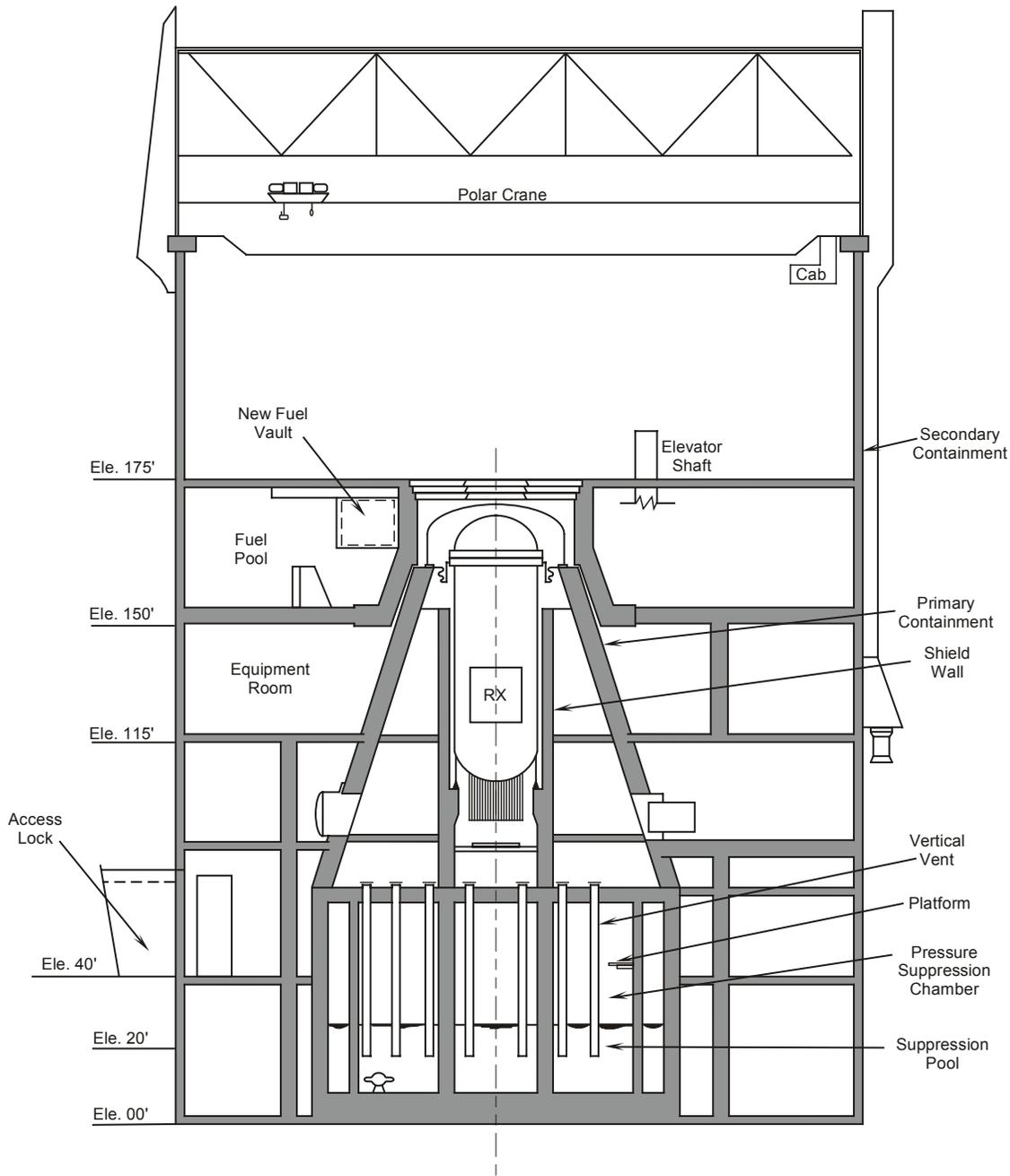
1. Identify the system's purposes.
2. Explain the function and operation of the following secondary containment features:
  - a. Reactor building
  - b. Relief panels
  - c. Airlocks
  - d. Reactor building normal ventilation system isolation valves and dampers
  - e. Unit area coolers
  - f. Primary containment purge system

# Objectives

3. List the conditions that will isolate the reactor building normal ventilation system (RBNVS).
4. Explain the following flow paths:
  - a. Air transfer through the RBNVS
  - b. Purge vent & exhaust from primary containment
5. Define secondary containment integrity.

# Objectives

6. Summarize the response of secondary containment equipment response to accident conditions.
7. Describe how secondary containment interrelates to the following:
  - a. Primary Containment System
  - b. Reactor Building Standby Ventilation System
  - c. Nuclear Steam Supply Shutoff System



- Reactor building
- Relief panels
- Air locks
- Reactor building normal ventilation system (RBNVS)
- Primary containment purge system (PCPS)

Figure 4.2-1 Mark II Containment

# Purpose

- The purposes of the Secondary Containment System are:
  - minimize the ground level release of radioactive material following an accident
  - to provide primary containment when the drywell or suppression chamber are open.

# Reactor Building

- Concrete
- Blowout panels
- Encloses primary containment
- Serves as primary containment when drywell or suppression chamber are open

# Relief panels

- turbine building blowout panels
- main steam tunnel relief vents
- the reactor building exterior metal siding.

# Airlocks

Entry to and exit from the reactor building are through double door personnel and equipment air locks. Each pair of access doors is equipped with rubber weather-strip type seals. The doors are electrically interlocked so that only one of the pair may be opened at a time.

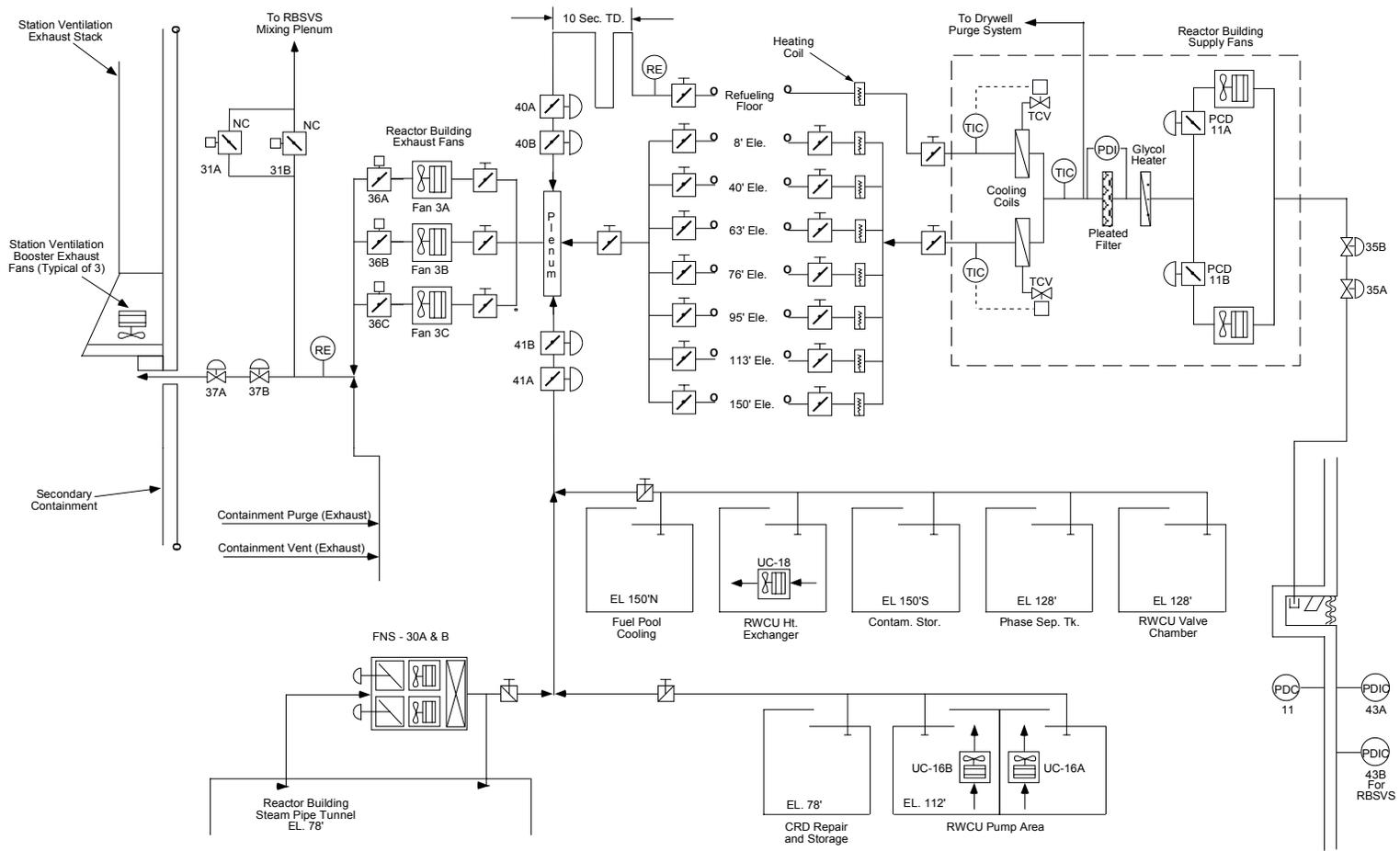


Figure 4.2.2 Reactor Building Normal Ventilation System

# RBNVS

The RBNVS consists of:

- heating and air conditioning supply units with two supply fans
- three exhaust fans
- distribution ducts
- manually positioned ventilation louvers
- differential pressure controlled dampers
- unit coolers
- controls and instrumentation.

# Sub-Atmospheric Pressure

- - 1.5 inch  $\Delta P$
- Prevents out-leakage
- Pressure control dampers

# RBNVS Supply Flow

- Intake louver
- Supply fans
- Pressure Control Dampers
- Heaters & coolers
- Distribution ducts

# RBNVS Exhaust Flow

- Exhaust plenum
- Refuel area
- Exhaust fans
- Station ventilation exhaust duct

# Area Unit Coolers

- Local
- Some are safety-related
- Auto-initiation
- RBSVS/Control Room Air Conditioning  
Chilled Water System cooling water

# Primary Containment Purge

- Primary Containment Purge System (PCPS)
  - a high efficiency particulate absolute (HEPA) filter
  - a charcoal adsorber
  - a fan
- De-inerts primary containment to allow normal personnel access

# Secondary Containment Integrity

- The operational conditions that require that secondary containment integrity must be maintained include:
- all times that primary containment integrity is required (i.e.; the reactor is critical or moderator temperature is  $>212\text{F}$  and fuel is in the reactor vessel)
- when fuel handling operations are in progress within the secondary containment
- when activities are being performed that have a potential for draining the reactor vessel.

# Secondary Containment Integrity

- reactor building is intact
- RBNVS automatic isolation valves are operable or deactivated in the closed position.
- RBSVS is operable.
- Secondary containment pressure is less than or equal to -1.5 inch H<sub>2</sub>O gauge.
- Secondary containment leakage rates are within specified limits.
- All containment penetration seal mechanisms are operable.
- At least one door in each access opening is closed.
- All equipment hatches are closed and sealed.

# Operations

- Normal
- Infrequent
- System Isolation

# Isolation Signals

- High drywell pressure high ( $\geq 1.69$  psig)
- Reactor vessel low low level (Level 2, -38 inches)
- Refuel area exhaust ventilation radiation high ( $\geq 35$  mR/hr)
- Vent/purge exhaust ventilation radiation high ( $\geq 5.4 \times 10^5$  cpm)
- Reactor Building low  $\Delta P$  ( $> -0.30$ " H<sub>2</sub>O)
- RBSVS initiation signal, multiple inputs.

# System Interfaces

- **Primary Containment System (Chapter 4.1)**
- **Reactor Building Standby Ventilation System (Chapter 4.3)**
- **Nuclear Steam Supply Shutoff System (Chapter 4.4)**
- **Emergency AC Power (Chapter 9.2)**

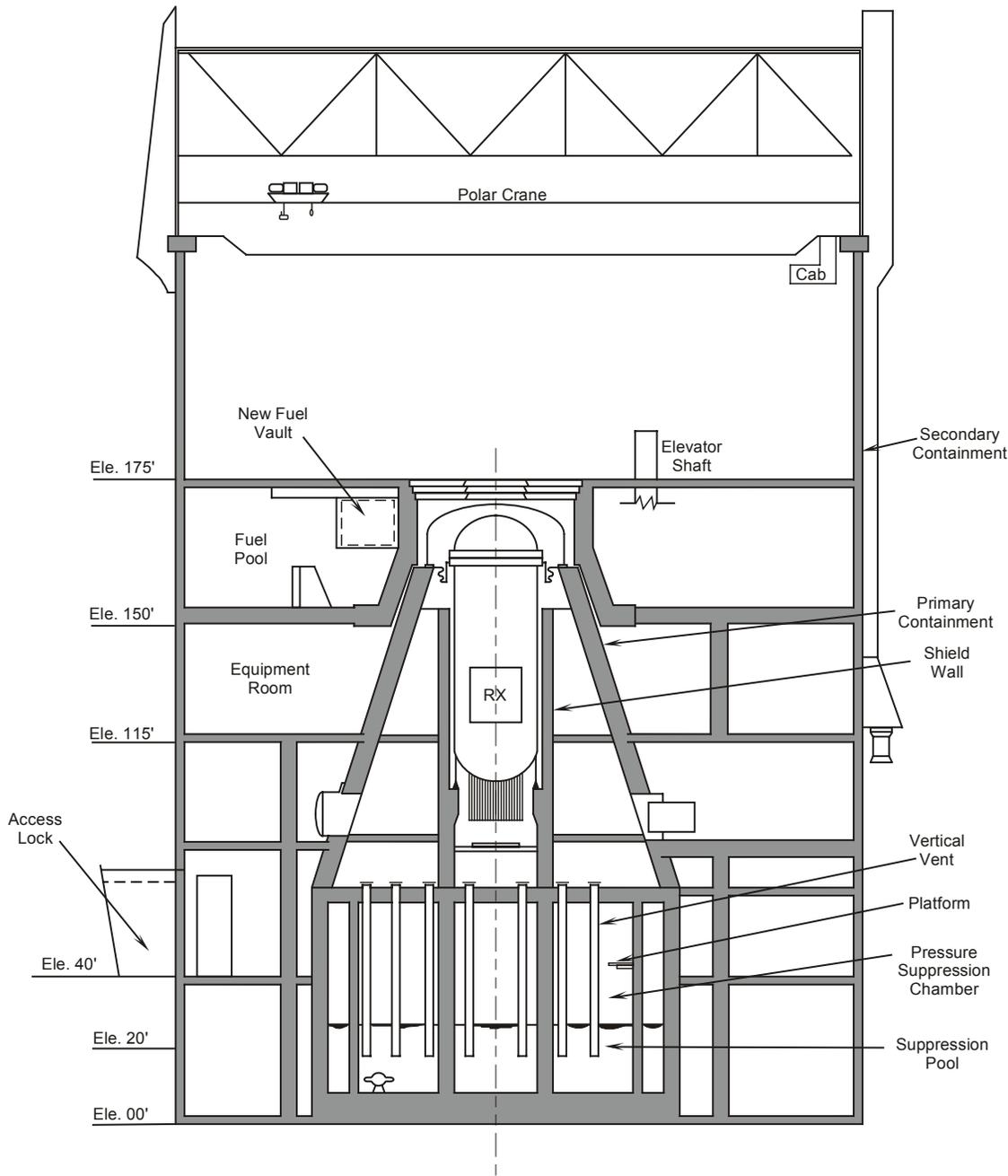


Figure 4.2-1 Mark II Containment

## REVIEW

- Relief panels
- Air locks
- Reactor building normal ventilation system (RBNVS)
- Primary containment purge system (PCPS)

# REVIEW

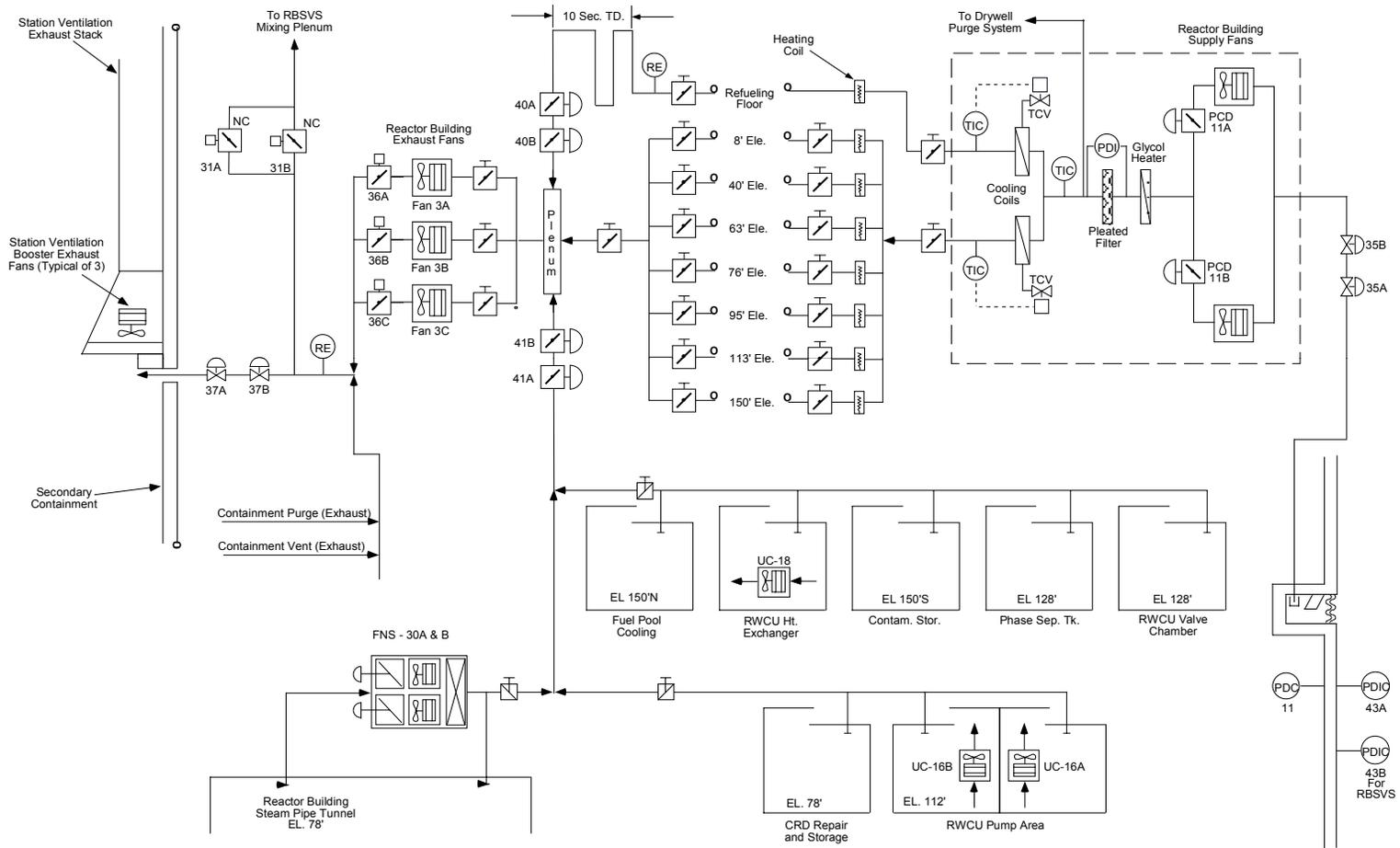


Figure 4.2.2 Reactor Building Normal Ventilation System

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# Objectives

3. List the conditions that will isolate the reactor building normal ventilation system (RBNVS).
4. Explain the following flow paths:
  - a. Air transfer through the RBNVS
  - b. Purge vent & exhaust from primary containment
5. Explain what constitutes the secondary containment barriers.
6. Define secondary containment integrity.

# Objectives

7. Summarize the response of secondary containment equipment response to accident conditions.
8. Describe how secondary containment interrelates to the following:
  - a. Primary Containment System
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Are there any questions?